Hindawi Publishing Corporation
Advances in Pharmacological Sciences
Volume 2012, Article ID 507278, 6 pages
doi:10.1155/2012/507278

Research Article

Protective Effects of Methylsulfonylmethane on Hemodynamics and Oxidative Stress in Monocrotaline-Induced Pulmonary Hypertensive Rats

Sadollah Mohammadi,[1,2,3] Moslem Najafi,[1] Hossein Hamzeiy,[1,4] Nasrin Maleki-Dizaji,[1,5] Masoud Pezeshkian,[6] Homayon Sadeghi-Bazargani,[7] Masoud Darabi,[8] Sara Mostafalou,[9] Shahab Bohlooli,[3] and Alireza Garjani[1,4,5]

[1] *Department of Pharmacology and Toxicology, School of Pharmacy, Tabriz University of Medical Sciences, Tabriz 5165665931, Iran*
[2] *Division of Molecular Toxicology, Institute of Environmental Medicine, Karolinska Institutet (KI), Box 210, 17177 Stockholm, Sweden*
[3] *Department of Pharmacology and Physiology, School of Medicine, Ardabil University of Medical Sciences, Ardabil 56135665, Iran*
[4] *Research Center for Pharmaceutical Nanotechnology (RCPN), Tabriz University of Medical Sciences, Tabriz 5165691749, Iran*
[5] *Drug Applied Research Center (DARC), Tabriz University of Medical Sciences, Tabriz 5165665811, Iran*
[6] *Department of Cardiac Surgery and Cardiovascular Research Center, School of Medicine, Tabriz University of Medical Sciences, Tabriz 5166615573, Iran*
[7] *Department of Statistics and Epidemiology, School of Health and Nutrition, Tabriz University of Medical Sciences, Tabriz 5166614711, Iran*
[8] *Department of Biochemistry and Clinical Laboratories, School of Medicine, Tabriz University of Medical Sciences, Tabriz 5166615731, Iran*
[9] *Department of Toxicology, Pharmaceutical Sciences Research Center (PSRC) and School of Pharmacy, Tehran University of Medical Sciences, Tehran 141556451, Iran*

Correspondence should be addressed to Alireza Garjani, garjania@tbzmed.ac.ir

Received 20 July 2012; Revised 23 September 2012; Accepted 23 September 2012

Academic Editor: Mustafa F. Lokhandwala

Methylsulfonylmethane (MSM) is naturally occurring organic sulfur that is known as a potent antioxidant/anti-inflammatory compound. The aim of this study was to investigate the effect of MSM on hemodynamics functions and oxidative stress in rats with monocrotaline- (MCT-) induced pulmonary arterial hypertension (PAH). Wistar rats were randomly assigned to 38-days treatment. MSM was administered to rats at 100, 200, and 400 mg/kg/day doses 10 days before a single dose of 60 mg/kg, IP, MCT. Hemodynamics of ventricles were determined by Powerlab AD instrument. Blood samples were obtained to evaluate changes in the antioxidative system including activities of catalase (CAT), superoxide dismutase (SOD), glutathione peroxidase (GPx), and the level of reduced glutathione (GSH) and malondialdehyde (MDA). Improvements in cardiopulmonary hemodynamics were observed in the MSM-treated pulmonary arterial hypertensive rats, with a significant reduction in right ventricular systolic pressure (RSVP) and an increase in the mean arterial pressure (MAP). The values of CAT, SOD, GSH-px activities, and GSH were significantly lower in MCT-induced PAH ($P < 0.01$), but they were recovered to control levels of MSM-treated groups. Our present results suggest that long-term administration of the MSM attenuates MCT-induced PAH in rats through modulation of oxidative stress and antioxidant defense.

1. Introduction

Pulmonary arterial hypertension (PAH) is a pathophysiological state characterized by a progressive increase in pulmonary vascular resistance. In addition to inducing myocardial hypertrophy, it also induces marked interstitial fibrosis to compensate for the increased ventricular workload. These adaptive changes often clinically lead to heart failure and sudden cardiac death [1]. Despite all current progress in the diagnosis and therapeutics, PAH continues to